# Biospheric Sciences Branch Highlights for March - April 2004

** Biospheric Sciences Branch (Code 923) host NASA Headquarters site visit

NASA Headquarters personnel from YS and YO visited GSFC and attended a three-day review on March 16-18. The attendees were Diane Wickland, Bill Emanuel, Garik Gutman, Ed Sheffner, Keya Chatterjee, and Woody Turner.

During these three days over forty presentations were made primarily from Branch personnel but also from others in Code 920 and 900. This is the first all round review of the Branch's programs since 1998 and was considered a worthwhile effort for both presenters and the review committee.

Full cost accounting and budget issues were also discussed, and dialogues on various subjects will be continued in the immediate future.

** GOFC/GOLD Workshop held in Russia: Observational Data in Support of the Northern Eurasia Earth Science Partnership Initiative (NEESPI)

During February 23-27, 2004, Don Deering co-organized and participated in a GOFC/GOLD Workshop in Repino, near St. Petersburg, Russia. The workshop, entitled, "Observational Data in Support of the Northern Eurasia Earth Science Partnership Initiative (NEESPI)" was designed to initiate the formation of GOFC-GOLD Northern Eurasia Regional Information Network (NERIN). The workshop was supported primarily by the START Program (SysTem for Analysis, Research and Training), the Canadian Forest Service and the Joint Research Center of the European Commission, as well as NASA and the Russian Academy of Sciences. About 80 workshop participants from the U.S., Europe (Austria, Estonia, Finland, France, Germany, Italy), Japan and Russia provided metadata for their institutional data sets and reviewed remotely sensed and in-situ data collected and archived by existing operational and scientific observational networks with a special emphasis on Russian data holdings at various Russian institutions. The workshop covered major thematic components of the NEESPI Science Plan with particular relevance to the boreal region of Northern Eurasia. Other participants from GSFC included Jeff Masek and Brent Holben. Jeff Masek and Ed Masuoka prepared CD-ROMs with sample data sets of Landsat and MODIS satellite data of Northern Eurasia that were distributed to the workshop participants. A second NERIN workshop will be held in Rostov-on-Don in August that will focus on data and special issues for the non-boreal regions of Northern Eurasia.

** SAFARI 2000 Special Issue of Global Change Biology Published

The March 2004 issue of Global Change Biology is dedicated to the SAFARI 2000 Kalahari Transect campaign. Approximately 50 scientists, including many regional scientists and students, collected data at five sites in Zambia and Botswana in March 2000. The sites spanned approximately 900 km of Kalahari savannas. A marked precipitation gradient extends from north-to-south along the Kalahari, leading the IGBP to designate it as a priority global change testbed. The SAFARI 2000 scientists focused primarily on characterizing the land surface structure and function with respect to exchanges of matter and energy with the atmosphere. The GCB Special Issue contains 12 articles describing results from the data analysis and modeling, including one by Jeffrey Privette and Yujie Wang, both of Code 923.

The issue was edited by Hank Shugart and Stephen Macko of the University of Virginia.

** Ross Nelson et al win first place award in Practical Papers competition

Ross Nelson (923), Jess Parker (Smithsonian Environmental Research Center), and Milt Hom (923/SSAI) are the first place recipients of the 2004 John I. Davidson Award for Practical Papers for their paper entitled "A Portable Airborne Laser System for Forest Inventory" (Photogrammetric Engineering and Remote Sensing 69(3): 267-273, March 2003 issue). This American Society of Photogrammetry and Remote Sensing award will be presented on May 26, 2004 at the Denver ASPRS meeting. Funding for the construction, testing, and operation of this portable airborne laser profiler was provided by Jerry Soffen (as head of the GSFC-DDF) and Darrel Williams, formerly Branch Head of the 923/Biospheric Sciences Branch.

** EO-1 Hyperion data reveal drought conditions in the Amazon

Two members of Code 923, Steve Ungar and Bob Knox, attended the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) workshop in Pasadena, CA, March 31-April 3. At a special SpectraSat Proposing Science Team session (chaired by Steve Ungar) Greg Asner, a member of the Earth Observing-1 (EO-1) Science Validation Team who has investigated the potential role of imaging spectroscopy (hyperspectral) remote sensing in global carbon monitoring, agreed to assume a leading role on the Science Team and participate in proposal preparation.

The use of EO-1 Hyperion data in revealing drought conditions in the Amazon rain forest will appear as a research paper by Asner and his colleagues in the April 20 proceedings of the National Academy of Sciences. The results of this

paper are highlighted on the Scientific American.com web site and are presented below.

The following is extracted from SCIENTIFIC AMERICAN.COM

SCIENCE NEWS
April 06, 2004

Satellite Data Reveal Drought in Amazon Rain Forest

Tracking subtle environmental changes in the Amazon Basin, home to the largest contiguous area of tropical forest in the world, is extremely difficult. Making matters more challenging are the area's large seasonal fluctuations in precipitation that affect climate and land use. A report published on-line this week by the Proceedings of the National Academy of Sciences outlines a new method of quantifying the effects of drought over the vast forest--from space.

"The Amazon is simply too big and complex to study on the ground alone," study author Gregory P. Asner of the Carnegie Institution in Stanford, Calif., says. "Thus far it's been impossible to determine some of the most basic properties of the forest that we need in order to understand what happens during common climatic events--such as the El Niño dry periods--and what that means to forest growth and the amount of carbon that is locked up in the forest via photosynthesis." Conventional remote-sensing approaches are not well suited to studying drought in tropical forests because the effects may be too subtle to detect or the biophysical mechanisms of the plants are not well understood, the researchers note. In the new work, Asner and his colleagues investigated a novel way of tracking conditions on the ground from space using NASA's Earth Observing-1 (EO-1) satellite. The technique, known as imaging spectroscopy [aka .... Hyperspectral ..... SGU], measures the amount of sunlight that is reflected off the earth. The amount of scattering occurring in the near-infrared region is then related to the water content of the forest canopy.

To test the satellite measurements against ground-based ones, the scientists set up a 10,000-square-meter site inside a forest that was experiencing drought. Essentially, they covered a large swath of the rain forest in plastic, depriving it of precipitation, and monitored soil moisture and other characteristics over time. According to the report, the [Hyperspectral .... SGU] satellite data are highly sensitive to drought conditions and the observations allowed the team to estimate the forest's carbon content and productivity with greater accuracy than current models do. Comments Asner, "The fact that we confirmed that satellite imaging can be used to measure something as detailed as the physiology of the rain forest canopy means that this technique might be useful for understanding other types of ecological phenomena at both large and small scales." --Sarah Graham